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a first magnetic shield and a second magnetic shield successively layered on a slider;

a reproduction head including a magneto-resistance effect element (hereinafter, referred to as an MR element) arranged between and contacting said [first] first and said second magnetic shields; and

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a recording head arranged adjacent to said reproduction head so as to use said second magnetic shield as a first magnetic pole film and having a second magnetic pole film opposing to said first magnetic pole via a magnetic gap;

said MR element comprising:

a center region including a ferromagnetic tunnel junction magneto-resistance effect film (hereinafter, referred to as a TMR film) having: a first ferromagnetic layer and a second ferromagnetic layer for generating a magneto-resistance effect using said first and said second magnetic shields as electrodes so that a current flows in [a] an almost vertical direction between said first and said second magnetic shields; and a tunnel barrier layer provided between said first and said second ferromagnetic layer; and

an end region arranged on each of two end surfaces of said MR element which run from the first and second magnetic shields, said end regions extending from said first magnetic shield to said second magnetic shield to sandwich said center region from both sides for applying a bias magnetic field to said center region.

Add the following new claims:

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--21. A magneto-resistance effect type composite head comprising:

a first magnetic shield serving as a first electrode and running in a first planar direction;

a reproduction head having a perimeter defined by upper and lower surface together with end surfaces, the lower surface contacting a center portion of an upper surface of said first magnetic shield;

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a first non-magnetic insulation contacting the upper surface of said first magnetic shield and the end surfaces of said reproduction head;

a second magnetic shield serving as a second electrode running in the first planar direction and contacting the upper surface of said reproduction head;

said reproduction head having a ferromagnetic tunnel junction magneto-resistance effect film with a tunnel barrier layer intermediate first and second ferromagnetic layers for generating a magneto-resistance effect using said first and said second magnetic shields as electrodes so that a current flows in a vertical direction between said first and said second magnetic shields;

a recording head arranged adjacent to said reproduction head so as to use said second magnetic shield as a first magnetic pole film and having a second magnetic pole film opposing to said first magnetic pole film via a magnetic gap; and

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a first end region extending from said first magnetic shield to said second magnetic shield and contacting a first of the end surfaces of said reproduction head and second end region extending from said first magnetic shield to said second magnetic shield and contacting a second of the end surfaces of said reproduction head, said first and second end regions for applying a bias magnetic field to said reproduction head.

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--22. A magneto-resistance effect element comprising:

a center region including a ferromagnetic tunnel junction magneto-resistance effect film (hereinafter, referred to as a TMR film) having a tunnel barrier layer provided between a first ferromagnetic layer and a second ferromagnetic layer; and

end regions arranged to sandwich said center region from two sides for applying a bias magnetic field to said center region,

wherein the center region has inclined end walls covered by an insulation film.

--23. (M) magneto-resistance effect element as claimed (i) claim 22, wherein a thickness of the insulation film is smaller than a thickness of the center region.

--24. A magneto-resistance effect element as claimed in claim 22, further comprising:

a permanent magnet layer, providing the TMR film with a bias field,

the permanent magnetic layer being electrically separated from the tunnel barrier layer of the TMR film by the insulation film.

--25. A magneto-resistance effect element as claimed in claim 22, wherein the TMR film comprises an undercoat layer, the first ferromagnetic layer, the tunnel barrier layer, the second ferromagnetic layer, and an anti-ferromagnetic layer successively arranged in this order.

--26. A magneto-resistance effect element as claimed in claim 22, wherein the TMR film comprises an undercoat layer, an antiferromagnetic layer, the first ferromagnetic layer, the tunnel barrier layer, the second ferromagnetic layer, and a non-magnetic conductive layer successively arranged in this order.

--27. A magneto-resistance effect element as claimed in claim 25, wherein said antiferromagnetic film is made from an alloy comprising as a main content Mn-X, wherein X represents at least one element selected from a group consisting of Cr, Fe, Co, Ni, Tc, Ru, Rh, Pd, Re, Os, Ir, and Pt.

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--28. A magneto-resistance effect element as claimed in claim 26, wherein said antiferromagnetic film is made from an alloy comprising as a main content Mn-X, wherein X represents at least one element selected from a group consisting of Cr, Fe, Co, Ni, Tc, Ru, Rh, Pd, Re, Os, Ir, and Pt.

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--29. A magneto-resistance effect element as claimed in claim 25, wherein said undercoat layer comprises as a main content at least one element selected from a group consisting of Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zr, Nb, Mo, Tc, Ru, Rh, Pd, Hf, Ta, W, Re, Os, Ir, Pt, and Si.

--30. A magneto-resistance effect element as claimed in claim 26, wherein said undercoat layer comprises as a main content at least one element selected from a group consisting of Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zr, Nb, Mo, Tc, Ru, Rh, Pd, Hf, Ta, W, Re, Os, Ir, Pt, and Si.

--31. A magneto-resistance effect element as claimed in claim 22, wherein said first and said second ferromagnetic layers are formed from Fe, Co, or Ni, or an alloy containing Fe, Co, or Ni.

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--32. A magneto-resistance effect head comprising:  
a pair of magnetic shields arranged facing to each other as electrodes;

a first magnetic shield serving as a first electrode and running in a first planar direction;

a reproduction head having a perimeter defined by upper and lower surface together with end surfaces, the lower surface contacting a center portion of an upper surface of said first magnetic shield;

a first non-magnetic insulation contacting the upper surface of said first magnetic shield and the end surfaces of said reproduction head;

a second magnetic shield serving as a second electrode running in the first planar direction and contacting the upper surface of said reproduction head;

said reproduction head having a ferromagnetic tunnel junction magneto-resistance effect film with a tunnel barrier layer intermediate first and second ferromagnetic layers for generating a magneto-resistance effect using said first and said second magnetic shields as electrodes so that a current flows in a vertical direction between said first and said second magnetic shields;

a recording head arranged adjacent to said reproduction head so as to use said second magnetic shield as a first magnetic pole film and having a second magnetic pole film opposing to said first magnetic pole via a magnetic gap; and

a first end region extending from said first magnetic shield to said second magnetic shield and contacting a first of the end surfaces of said reproduction head and

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second end region extending from said first magnetic shield to said second magnetic shield and contacting a second of the end surfaces of said reproduction head, said first and second end regions for applying a bias magnetic field to said reproduction head;

the center region being intermediate the pair of magnetic shields so that flowing almost in a vertical direction to the magnetic shields.

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22-33. A magneto-resistance effect head as claimed in claim 32, wherein the magnetic shields are formed from a soft magnetic alloy containing Fe, Co, and Ni as main contents, or an amorphous soft magnetic alloy containing as a main content Co-M (wherein M represents at least one element selected from a group consisting of Ti, V, Cr, Fe, Ni, Cu, Zr, Nb, Mo, Tc, Ru, Rh, Pd, Hf, Ta, W, Re, Os, Ir, Pt, Si, and Al), or a soft magnetic alloy containing as a main content T-A-B (wherein T represents at least one element selected from a group consisting of Fe, Co, and Ni; A represents at least one element selected from a group consisting of Ti, V, Cr, Cu, Zr, Nb, Mo, Tc, Ru, Rh, Pd, Hf, Ta, W, Re, Os, Ir, Pt, Si and Al; and B represents at least one element selected from a group consisting of B, C, N, and O), or as a soft magnetic alloy containing Fe-Si-Al as a main content.--